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APPLICATION NO.	FILING DATE	FIRST-NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/508,034	06/06/2000	KARL PICHLER	C1043/7019	2505

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EXAMINER

HODGES, MATTHEW P

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/508,034

Applicant(s)

PICHLER ET AL.

Examiner

Matt P Hodges

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The MAILING DATE of this communication appears on the cover sheet with the correspondence address

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 06 June 2000.

2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-49 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1, 2, 4, 5-8, 11-13, 16-22, and 44-48 is/are rejected.

7) ☒ Claim(s) 3, 9, 10, 14, 15, 23-43 and 49 is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 06 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All b) ☐ Some * c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

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DETAILED ACTION

Response to Amendment

The Amendment, filed on 06/06/2000, has been entered and acknowledged by the Examiner.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

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The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 26 line 4, "Transport Layer" does not have proper antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

A single step claim, i.e., where a steps recitation does not appear in combination with another recited step in the method of manufacture, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. A single step method claim which covers every conceivable step for achieving the stated purpose is nonenabling for the scope of the claim because the specification discloses at most only those steps known to the inventor. When claims depend on a recited property, where the claim covers every conceivable structure (step) for achieving the stated property (manufacture of the product) while the specification discloses at most only those known to the inventor.

Therefore Claims 44-46 are rejected as the scope of enablement provided to one skilled in the art is not commensurate with the scope of protection sought by the claims.

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Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 2, applicant claims a process of removing physisorbed water from the substrate prior to forming the at least one polymer layer. However in the specification applicant only discloses the process of removing the physisorbed water from the exposed surface before forming another layer on the exposed surface. In this case the first electrode is formed over the substrate and the polymer layer is formed over the first electrode thus not on the exposed surface of the substrate.

Examiner believes that the applicant intended to state that the removal of physisorbed water was to be done on the surface of the first electrode prior to the forming of the at least one polymer layer. Therefore for the purposes of examination, Examiner will treat claim 2 as if the word "substrate" were replaced by "first electrode".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 45 is rejected under 35 U.S.C. 102(b) as being anticipated by Bladon (US 5,276,290).

Regarding claim 45, Bladon discloses a process of treating the surface pH in order to ensure bonding according to the surface charge attraction was pH independent. (Column 6 lines 46-48) and (Column 7 lines 1-13).

Claim 45 is rejected under 35 U.S.C. 102(b) as being anticipated by Larm et al. (US 5,213,898).

Regarding claim 45, Larm discloses a process of quaternizing the amino groups on the substrate leaving the surface positively charged. (Column 4 lines 34-37).

Claim 46 is rejected under 35 U.S.C. 102(b) as being anticipated by Decher et al. (US 5,208,111).

Regarding claim 46, Decher discloses a process of oxidizing the thiol groups to leaving the surface charged. (Column 4 lines 47-56).

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 5, 8, 11-13, 16-22, 47, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 5,798,170) in view of Decher et al. (US 5,208,111).

Regarding claims 1, 47, and 48, Zhang discloses (see figure 15) an organic light emitting device including a first electrode (16) formed on the substrate (18), second electrode (12), organic light emitting layer (14), and a conductive layer (15), where the latter two layers are located between the two electrodes. (Column 5 line 57 to Column 6 line 3). However Zhang does not appear to specifically state the use of a polymer layer made by process of self-assemble as the conductive layer. However Decher, in the same field of endeavor, discloses the use of polymer films formed by self assemble. This process produces ordered, defect free systems at the molecular level that can be produced at a much higher degree of accuracy with respect to the layer thickness. This homogenous layer thickness enhances the control of the organic light emitting device and allows for less undesirable fluctuations in performance. (Column 1 lines 27-37). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the self assemble film as taught by Decher into the organic light emitting device (OLED) disclosed by Zhang in order to enhance the control and performance of the device.

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Regarding claim 2, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the removal of physisorbed water from the surface of the electrode. However Decher discloses the use of methanol/toluene to remove traces of water in order to prepare the surface for a silanation reaction that prepares the surface for the self assemble process. (Column 17 lines 55-58). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the water removal from the exposed surface as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher in order to better prepare the surface for a successful self assemble.

Regarding claims 4, 5, and 22, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the formation of a coupling layer by silylating the substrate. However Decher discloses the use of silanes on the surface of the substrate after removing excess water to form a coupling layer that prepares the substrate for the first polymer layer of the self assemble process. (Column 4 lines 40-45). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the silanation of the exposed surface as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher in order to better prepare the surface for a successful self assemble.

Regarding claim 8, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the oxidation of thiol groups to charge the surface and thus prepare it for self assemble. However Decher discloses the use of oxidizing thiol groups in the rejection of claim 46 above. Preparing charged surfaces is beneficial to advantageously allow for the immediate application of the first self

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assemble layer. (Column 12 lines 34-41). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use oxidizing thiol groups as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher to advantageously allow for the immediate application of the first self assemble layer.

Regarding claims 11-13, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the composition of the self assemble layer. However Decher discloses the use of bilayers composed of positively and negatively charged particles. Each layers forming on the previous evenly and at a predetermined width due to the electrostatic attraction of the ions. (Column 3 lines 5-10). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the bilayers composed of positively and negatively charged particles as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher for the same reasons as listed in the rejection of claim 1 above.

Regarding claims 16 and 17, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the thickness of the self assemble layer. However Decher discloses the use of polymer layers 18.5 nm wide. Thin layers are advantageous for the reasons listed in the rejection of claim 1 above. (Column 12 lines 34-41). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the use of polymer layers 18.5 nm wide as disclosed by Decher into the method of fabricating an OLED as taught by Zhang in view of Decher for the same reasons as listed in the rejection of claim 1 above.

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Regarding claims 18-21, Zhang further states that the luminescent layer is a semiconducting conjugated polymer or PPV. (Column 7 lines 8-12). Further the organic luminescent layer is between 10 and 100nm thick. (Column 7 lines 33-37).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 5,798,170) in view of Decher et al. (US 5,208,111) and further in view of Bladon (US 5,276,290).

Regarding claim 6, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the preparation of the surface to allow for surface charge attraction that is pH independent. However Bladon discloses a process of treating the surface pH in order to ensure bonding according to the surface charge attraction in the rejection of claim 44 above. Preparing charged surfaces is beneficial to advantageously allow for the immediate application of the first self assemble layer. (Column 12 lines 34-41). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the preparation of the surface to allow for surface charge attraction that is pH independent as disclosed by Bladon into the method of fabricating an OLED as taught by Zhang in view of Decher to advantageously allow for the immediate application of the first self assemble layer.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (US 5,798,170) in view of Decher et al. (US 5,208,111) and further in view of Larm et al. (US 5,213,898).

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Regarding claim 7, Zhang in view of Decher (as taught in the rejection of claim 1 above) discloses the method of fabricating an OLED as claimed but does not specify the preparation of the surface to allow for surface charge attraction that is pH independent. However Larm discloses a process of quaternizing the amino groups on the substrate leaving the surface positively charged in the rejection of claim 44 above. Preparing charged surfaces is beneficial to advantageously allow for the immediate application of the first self assemble layer. (Column 12 lines 34-41). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate quaternizing the amino groups on the substrate leaving the surface positively charged as disclosed by Larm into the method of fabricating an OLED as taught by Zhang in view of Decher to advantageously allow for the immediate application of the first self assemble layer.

Allowable Subject Matter

Claims 3, 9, 10, 14, 15, 23-43, and 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 3, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 3, and specifically comprising the limitation the use of heat to remove physisorbed water from the surface of a electrode before self assemble on that surface.

Regarding claim 9, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 9, and specifically comprising the limitation

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of using a substrate composed of a glass or plastic to be used in the creation of a OLED including a polymer made from self assemble.

Regarding claim 10, claim 10 is allowable for the reasons given in claim 9 because of their dependency status from claim 9.

Regarding claim 14, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 14, and specifically comprising the limitation of a self assemble layer where the attraction of the bilayers is by donor/acceptor interaction.

Regarding claim 15, claim 15 is allowable for the reasons given in claim 14 because of their dependency status from claim 14.

Regarding claim 23, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 23, and specifically comprising the limitation of a OLED with a polymer layer formed by self assemble where the polymer layer has electronic or optical properties that vary with the thickness of the layer.

Regarding claims 24-43, claims 24-43 are allowable for the reasons given in claim 23 because of their dependency status from claim 23.

Regarding claim 49, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 49, and specifically comprising the limitation of a OLED with a polymer layer formed by self assemble where the polymer layer has electronic or optical properties that vary with the thickness of the layer.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Marks et al. (US 6,399,221) discloses the use of various assemble processes for an OLED.

Papadimitrakopoulos (US 5,946,550) discloses the use of self assemble structures on a semiconductor.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matt P Hodges whose telephone number is (703) 305-4015. The examiner can normally be reached on 7:30 AM to 4:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

mph 
November 20, 2002


ASHOK PATEL
PRIMARY EXAMINER